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ABSTRACT

This paper discusses how the role of instructors changes as young learners advance along a mastery continuum, or a process of transition from an initial novice to an eventual expert status in the learning of a skill. Four stages along this continuum are: (1) acquisition, in which the learner does not know the task; (2) early consolidation, in which the learner can perform part or all of the task, but cannot do so independently; (3) late consolidation, in which the learner can demonstrate some spontaneous mastery of the task; and (4) independent mastery, in which the learner can perform the task independently and without prompting. It is hypothesized that, when children learn a task, their level of cognitive ability interacts with task complexity to encourage or inhibit the children's development of self-regulatory learning behavior and expertise in learning the task. Learning opportunities and activities which correspond to a child's point along the mastery continuum are described. Suggestions for ways that teachers can create skill acquisition, consolidation, and mastery opportunities for less advanced children that are comparable to opportunities for more advanced children are offered. A list of 33 references is provided. (MDM)

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How Task-Directive Dialogue Changes with Mastery and Capacity[1]

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Abstract

The main focus of this paper will be how the role of **instructors** (tutors/teachers/experts) changes as **learners** (tutees/pupils/novices) make the transition from beginning to acquire a new skill to high level mastery or "expertise" in applying the skill in new situations. We suggest four phases in a mastery continuum: acquisition, early consolidation, late consolidation, and independent mastery. These reflect increasing levels of self-regulation and expertise. We suggest that levels of developed cognitive capacity interact with task complexity to encourage or inhibit the development of self-regulation and expertise. In schools, learning settings for specific skills should correspond to the child's point in the mastery continuum to foster continued progress. We suggest that this tends to be true for more cognitively advanced children, but not for less advanced children. We propose program modifications to encourage increased mastery and expertise among less cognitively advanced children. We note that one implication of these proposals would be that children would not cover the same "curriculum" in the same period of time. We anticipate, however, that achieving higher levels of expertise and ability to apply relevant skills would be advantageous for all.

How Task-Directive Dialogue Changes with Mastery and Capacity

Andrew Biemiller and Donald Meichenbaum

The main focus of this presentation will be how the role of **instructors** (tutors/teachers/experts) changes as **learners** (tutees/pupils/novices) make the transition from beginning to acquire a new skill to high level mastery or "expertise" in applying the skill in new situations. We will suggest that matching the quality of instructional support to children's progress along a "mastery continuum" will foster greater levels of expertise or ability to independently apply learned skills as needed.

Becoming an "Elementary Expert" - The Mastery Continuum

The extensive literature on "expertise" indicates that those who have become unusually competent in a particular domain differ from others in the knowledge they have about their domain of expertise, in their ability to access, organize, and employ that knowledge, in the strategies they use to solve problems, and in their motivation or striving for mastery. In a recent study of "elementary experts"[2], we found that these children differedfrom others by spontaneously talking about tasks more frequently than

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[2] Children nominated by teachers as "self-directed" or "knowing what to do and doing it".

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less "self-directed children" (indicating the presence of more verbal knowledge about their tasks). This talk included specific problem-solving strategies as well as general planning and monitoring statements. In addition, the self-directed children expressed more positive affect and "can do" statements. (Meichenbaum and Biemiller, in press) In short, these elementary school children displayed many characteristics associated with "expertise"[3].

The mastery continuum. We suggest that this transition from initial "novice" status to eventual "expert" status - that is, to the ability to flexibly apply a skill as needed in new situations - can be characterized as a "mastery continuum". We recognize that this transition is a complex and recursive process. Children may take two steps forward and one step back. None the less, we identify four major points on this continuum:

(1) **Acquisition**: The learner initially cannot perform or explain the task[4]. The learner does not know the sequence of procedures to perform, nor verbal labels

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[3] The one major feature of expertise that we did not see in our "elementary experts" was higher order organization of knowledge. This was not surprising as increased spontaneous organization of memory and knowledge is normally a characteristic which appears in adolescence.

[4] "Tasks" usually involve the application of acts or procedures to objects. Skills are "tasks" which can be applied to a specified category of objects rather than specific objects. For example, infants can grasp a variety of objects if the objects are small enough and mobile. Specific applications of skills are "tasks".

for each procedure, nor the overall "definition" of the task - a label for retrieving it and some sense of what the task is for or when it is used.

(2) **Early Consolidation**: Following some initial demonstration and instruction, the learner can perform part or all of a task. However, the learner will have difficulty verbalizing the task, and may require direct verbal prompts for some procedures. (As a result of initial acquisition, the learner "knows" what the prompts refer to. (E.g., "Mind your p's and q's!".)

(3) **Late Consolidation**: As a consequence of continued practice and further verbal support and demonstration, the learner begins to demonstrate some spontaneous mastery of the task. When encountering difficulty, the learner may overtly dialogue with herself as a means of solving problems[1]. The learner may also assist others with direct verbal advice. Some of the "practice" may have an "applied" character in the sense that the task results or products "matter" to the child.

(4) **Independent Mastery**: By this point, the learner is able to use the "new" skill in situations in which the

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[1] She may, of course, covertly dialogue with herself without an observer "seeing" this.

skill is relevant but not explicitly called for.

The main thesis of this talk is that appropriately fostering progress for each child in each part of the mastery continuum would help a substantially larger portion of the population to achieve "elementary expertise" in reading, writing, and arithmetic. A corollary of this thesis is that for a variety of reasons, many children do not presently experience "appropriate fostering" as they progress through the mastery continuum, and that many do not in fact achieve independent mastery of skills taught.

Self-Regulation, Cognitive Capacity, and Learning Settings - A Transactional Perspective

A substantial body of research indicates that children who perform well in school engage in substantially more overt and covert verbal self-regulatory activity than their less able peers.[6] We have formulated a transactional theory of how able children come to demonstrate these higher levels of verbal self-regulation.

Modern cognitive theory suggests that one aspect of cognitive development is a growing capacity to process increasingly complex tasks (Case, 1985; Fischer & Pipp, 1984). To illustrate, we do not attempt to teach calculus to three year

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[6] E.g., Diaz (in press); Meichenbaum (1984); Meichenbaum and Biemiller (1991); Peterson (1988); Prawat (1989); Pressley et al (1990); Zimmermann & Shunk, 1989).

olds, or even nine year olds!

We add the hypothesis that engaging in task-directive speech requires a certain amount of cognitive capacity' If this hypothesis is correct, it follows that one can only engage in task-directive speech if one's current task does not require all of one's current cognitive capacity. In other words, we need a certain amount of "surplus" cognitive capacity in order to talk to ourselves or others while carrying out a task.

The literature on expertise also indicates that in adult experts, higher-order concepts can reduce cognitive demands on the "executive" system (Bereiter and Scardamalia, 1986). The same is true for children. For example, a first grader may be observed struggling with the writing of individual letters. Later, forming letters has become proceduralized or "automatic", while the child struggles with spelling a word. Still later, the spelling of words is also proceduralized (if not always accurate!), and the child's attention has shifted to the content of the text being written. At this latter point, neither the formation of letters nor the spelling of words usually occupies much of the child's attention or "executive capacity". The proposition that well-practiced skillls and procedures place less demands on active cognitive capacity and working memory has been discussed at length by Case (1985) and LaBerge and Samuels (1974).

' We first put forward this view in an article in Educational Leadership (Biemiller & Meichenbaum, in press).

We hypothesize that in a typical classroom, children vary substantially in both the amount of cognitive capacity they have developed at any given point in time, and also in the amount of cognitive capacity specific tasks demand from them. It follows that if a number of children of the same age are introduced to the same tasks at the same time, some will have more "surplus cognitive capacity" than others. As a result, these children have more potential to develop and use task-directive language regarding these tasks, and quickly find themselves assisting others. As a child acquires effective task-directive speech, even more "surplus capacity" may be made available as a result of "recoding" executive tasks in simpler terms (Case, 1985).

Available evidence is consistent with this hypothesis if we accept higher I.Q.'s as crude evidence of advanced "cognitive capacity".

This situation is very good for those with surplus capacity - it facilitates their ability to articulate or verbally regulate their own and others' activity. By verbalizing activity, cognitively advanced children gain mastery and expertise regarding material learned in school. However, those children with less "surplus capacity" get a lot of experience in making requests for help, but little in using task-directive language to help others or to solve their own problems. As we will elaborate in succeeding sections, we hypothesize that developing comparable expertise in children with less developed cognitive capacity will require adjustment of tasks acquired at

given points in time as well as increased opportunities to assist others and to apply skills that they have mastered.

A Continuum of Learning Settings

"Behavior settings" are environmental units defined by space, time, and specific action patterns and purposes (Barker, 1968; Schoggen, 1989). In schools, some behavior settings are specifically designed to foster learning at one or more points in the mastery continuum. We have proposed a continuum of school "learning settings" for children acquiring expertise (Meichenbaum & Biemiller, in press). These correspond to points on the mastery continuum described previously. Thus there are learning settings for acquisition, early and late consolidation, and independent mastery. In this paper, we are going to explore this proposal in more detail. We will consider the implications of this proposal for teaching children of similar ages but differing levels of cognitive development. We will also examine how "scaffolding" and other aspects of instructional support can be supplied over extended periods of mastery. In the long run, we will argue that each child needs to experience all of these settings in each major educational domain if the child is to achieve independent mastery of that domain.

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Acquisition settings[9]. These are settings in which the learner is first introduced to new skills, procedures, information, etc. These are transferred to the learner by modelling actions, verbal description, written instruction, and sometimes modelling self-directed speech. Teachers work examples. In acquisition settings, the instructor also defines the task (Wertsch, 1984), and shows how being able to perform the task is relevant or useful[9]. Acquisition settings are usually highly "instructor-centered" and usually emphasize the process of the task being taught rather than the product of the task.

Consolidation settings. Consolidating recently acquired skills involves the use of tasks of controlled complexity (e.g., basal readers, math worksheets), combined with verbal support ranging from direct commands to indirect "hints". This consolidation occurs through "practice" on tasks (e.g., worksheets) selected by the instructor[10]. Scaffolding tasks for consolidation involves both:

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[9] In Meichenbaum and Biemiller (in press), we used the term "instructional settings" to describe acquisition settings. We prefer "acquisition" because acquisition of new skills can occur without formal instruction - through written materials, videotapes, and problem solving.

[9] This is sometimes called "situating" the task (Collins, Brown, and Newman, 1989).

[10] "Practice" or "drill" have become unpopular terms. We may now try to increase motivation by "practicing" on "relevant content" in "authentic contexts". This may be a good idea, providing it is possible to maintain effective scaffolding.

(1) modifying tasks from their "real-world" form to one that is manageable by the novice, and

(2) helping the novice recall, learn, and/or generate the steps of the task with the ubiquitous "hints" and other verbal and non-verbal "prompts" described by Vygotsky (1978), Wood (1988), and other researchers[11].

In schools, consolidation settings are often called "independent work". There is usually some emphasis on both the process (e.g., how the child carries out tasks) and the product (e.g., are the results "correct" or acceptable for public consumption?). The amount of guidance or assistance permitted from peers has varied widely. At present, one of the consequences of the "open education" movement (Good & Brophy, 1987, pp 374-380) has been an increase in permitted peer assistance, and reorganization of the classroom environment to encourage consultation among children.

We have divided consolidation settings into two categories,

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[11] Here are two examples of scaffolding which reduces complexity of plan to be learned:

1. Child learning to ride a two-wheel bicycle. Parent forms literal scaffold, running beside child until child is "stable". Parent may then run near child to maintain security (parent's or child's?).

2. Child learning to play chess (checkers, etc.). Parent or "expert" friend may reduce the number of pieces on the board, or reduce number of own pieces in order to make learner's task more manageable - i.e., less complex.)

early and late consolidation.

Early Consolidation Settings. In early consolidation settings, we hypothesize that assistance provided by instructors (including other more experienced learners) should include direct planning and monitoring statements and questions. (e.g., "Should you add the second column now?") "Direct" planning statements call for specific procedures[11]. Instructors may perform part of the task at hand in order to "scaffold" or simplify the task for learners.

In our current observational study of assistance, we found that assistance is much more likely to enable children to continue their tasks if the assistance was requested by the recipient, than if it was imposed by the assistor. Imposed assistance may have occurred more frequently on tasks that were beyond the recipient's ability either for reasons of instruction or capacity. Thus teachers must be sensitive to the potential of the recipient to profit from assistance.

Late consolidation settings. In late consolidation settings, we hypothesize that assistance provided by instructors should include mainly indirect planning and monitoring statements and questions (e.g., "What do you think you need to do next?") "Indirect" statements and questions do not call for specific

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[11] Freyslinger (1991) points out that these "direct" statements or questions can be worded in ways that leave "ownership" or control of a task with the learner (e.g., "Do you want to add the second column now?" or can appropriate control to the instructor (e.g., "Add the second column now!").

procedures. Instead, they invoke a problem-solving process on the part of the learner. (E.g., "What do you need to do when adding large numbers?") Instructors and others should be doing less or none of the task for the learners. The learners should be able to provide substantial monitoring and planning assistance to each other.

The existing research literature on teaching (e.g., Good & Brophy, 1987) suggests that more advanced children tend to receive "higher level" or more indirect assistance. However, this literature usually does not examine the role of task difficulty or progress through the mastery continuum. We suggest that experimental methods will be required to examine this.

Independent Mastery settings. These settings are primarily concerned with the independent mastery of skills - recently acquired or otherwise developed. The learner must be creating or inventing new tasks, or independently solving problems. In schools, teachers try to provide independent mastery opportunities with "projects", such as the building of a castle, cooking, or the planning and conduct of a trip. These usually require the integration of many different skills, new and old. These settings are often partially or highly "child-centered" - i.e., learners may play an active role in choosing and/or designing tasks, explicitly or implicitly selecting task complexity (difficulty), and determining what products or results should be achieved. The "mastery" aspect of the setting may be a

"hidden agenda" on the part of the teacher. We suspect that frequently children do not perceive these settings as "doing math" or "doing writing", but rather as "planning a budget" or "making a play". In independent mastery settings, there is often more of an emphasis on the creation of public "products" (e.g., "published" stories, letters that are actually sent, dramatic presentations to be given to an audience, posters to be displayed).[13] Thus, in these settings, there is a "legitimate" concern for the quality of performance (being correct, clear, neat, etc.) Among other possibilities, mastery settings may include teaching roles with younger children (e.g., reading to kindergartners, math tutors), planning trips, and other "community help" activities.

"Application" and Independent Mastery. It is highly desirable to ensure some degree of "application" or "relevance" in most learning settings, including acquisition and consolidation. Application draws on relevant past experience, knowledge and strategies. It provides opportunities for children to experience the value of skills for them. We stress independent application as an indicator of mastery - of the child's ability to use learned skills in contexts which the child

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[13] This aspect of mastery settings is discussed at length by Lave, 1977, in press; and by Collins et al, 1989. Lave and Collins et al prefer to see "well-situated" or "real-world" tasks from the start. Their metaphor begins with adolescent or adult apprentices in a real shop. We think it is stretching credulity to claim to accomplish this with most elementary school children.

perceives as important.

Summary of Settings Used in the Mastery Continuum. In summary, we identify four different kinds of learning settings that children should experience as they gain mastery in particular skills. These include (1) **acquisition**; (2) **early consolidation**; (3) **late consolidation**; and (4) **independent mastery**. While this appears to be a sequential instructional model, we wish to emphasize that in practice, these settings may occur in almost any order. Problems encountered in mastery settings may lead to the acquisition of new skills. "Consolidation" continues to happen whenever the child uses a skill. What is important is that each child experience all of these settings, and do so with adequate skills and knowledge to gain from each setting.

How Able Children Experience Learning Settings

We can get some ideas about the appropriate use of different learning settings by observing those who now profit from them. We hypothesize that able children[14], who are perceived by teachers as "thriving" or "self-directed" and perform at high percentiles on standardized tests, currently experience these

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[14] These are variously described as "thrivers" (Thomas, Chess, & Birch, 1968; Biemiller & Richards, 1986); "self-directed" (Biemiller & Richards, 1986; Meichenbaum & Biemiller, in press; "self-regulated" (Zimmermann & Martinez-Pons, 1988, 1990); etc.

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learning settings as follows:

Acquisition settings. Able children acquire "basics" of new tasks quickly, following demonstration and verbal instruction. They are often ready to proceed to early consolidation settings - sometimes even on the first day of instruction in a new skill. We hypothesize that the rapid initial task acquisition of able children may be related to "surplus cognitive capacity".

Less advanced children frequently have assignments they cannot handle. This point is established by standardized test norms as well as comments in Good and Brophy (1987), Holt (1959), and elsewhere.

Consolidation (early and late) settings. Typically, consolidation settings appear to be "well-scaffolded" for able children in the sense that the tasks are not too difficult and the levels of support available are adequate for these children. In our current observational study of assistance, about three-quarters of received assistance episodes resulted in more self-directed children clearly continuing their tasks. Only about a third of episodes in which less self-directed children received assistance had this effect. During "consolidation", able children get much experience in articulating the new task to self and others (Collins et al, 1989;, Meichenbaum & Biemiller, in press). They use teachers as consultants. They experiment or "play" with tasks, varying parameters (Kanevsky, 1990).

We have seen many instances of able children providing support to others in settings that we would call "late consolidation" for the able child. In our current observational study of more versus less self-directed children, we found the more self-directed children assisting others about once every 15 minutes. Twelve of 13 children assisted others at least once in a half hour observation. Among less self-directed children, assisting others occurred on an average of once an hour. Only four of 13 children were ever observed to assist others.

Independent Mastery settings. When "projects", "themes", or "integrated activities" are carried out, we hypothesize that relatively advanced children actually demonstrate independent mastery by applying their skills. They "see" the possibilities or "affordances" (Gibson, 1982) of situations. Other less advanced children may simply receive further consolidation experience, carrying out procedures as advised by advanced children.

Summary. "Able children" acquire new skills quickly, consolidate quickly, and soon find themselves assisting others and being able to apply their new skills in different situations. Less advanced children do not. Thus, able and less able children may gain different kinds of experience from objectively similar situations.

How Can We Create Comparable Acquisition, Consolidation and Mastery Opportunities for Less Advanced Children?

In the following section, we will be discussing settings from the viewpoint of a hypothetical "target child". Other children may be in the same physical settings but experiencing different mastery opportunities.

Establishing supportive acquisition settings. We suggest that changes in how we use acquisition settings with less advanced children might include (1) the age at which specific new tasks would be introduced to children; and (2) placing greater stress on modelling task-directive speech.

Note that these suggestions imply use of homogenous (for ability) groups in acquisition settings.

Establishing supportive early consolidation settings. If acquisitions are well paced - that is, if new tasks are not introduced too early nor too rapidly for the children in question - we would expect children to be able to move into "early consolidation" work on the same day as a new task was first introduced. We suggest that changes to early consolidation settings for less advanced children would include (1) careful attention to task difficulty; (2) provision of assistance as needed in the form of direct task statements; and (3) use of task-sharing arrangements. Older and more advanced peers may be an excellent source of assistance.

Note that these suggestions for early consolidation settings imply use of heterogenous ability groups - with target children being less able.

Establishing supportive late consolidation settings. We suggest that as children begin to demonstrate competent performance in early consolidation and some spontaneous task-directive statements, the setting should be gradually changed to late consolidation. This would involve (1) use of indirect assistance by others; and (2) situations in which the target children were relative "experts".

In a current laboratory study, we are finding that "less self-directed children" are capable of demonstrating "expert-like" task-directive speech when assisting others on tasks on which the "less self-directed" children are competent. We suggest that routinely creating this situation - which occurs frequently for the more advanced children - would be of great benefit for the less advanced.

Note that this approach to late consolidation settings implies heterogenous ability groups - with target children being the more able.

Establishing independent mastery settings which allow less advanced children to make their own applications. Depending on the complexity of the activity, independent mastery settings may be possible at about the same time as "late consolidation"

activities. In other cases, the level of task complexity that can be successfully **applied independently** may prove to be below that which can be performed when tasks are simply set out (as in worksheets). For example, norms for "mathematics problem solving" (solving math word problems) suggest that children of a given age typically solve problems involving the previous year's level of complexity when cast in word problems. In general, we hypothesize that target children should have high levels of performance and ability to talk about the task effectively to others.[15] We suggest (1) that children for whom independent mastery is the goal be the most advanced in a group in the skill in question; (2) that instructor assistance be limited to "indirect" statements or questions; and (3) that assistance might include "knowledge context" or connecting the current task to other related tasks. Recall that application settings are usually integrative in character - that "target skills" are essentially a hidden agenda.

Note that these suggestions imply homogenous ability groups or heterogenous groups with target children being the more able.

Creating and Operating Expertise-Supporting Programs

We recognize that the type of teaching envisioned here

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[15] Regarding the "application" aspects of settings: These may also be used to "set the stage" - to indicate why certain skills are needed. Hence we are using the term "application" both at the beginning and end of task/skill mastery. A given setting may provide opportunities both for applying learned skills and for perceiving the need to acquire new skills.

involves a fundamentally more complex educational program than is now common. We do not propose to design an entire curriculum in this paper, nor do we believe there is a single program design which flows from our suggestions. However, we can suggest some general characteristics of programs which are designed to meet the learning needs of a wider range of children. These programs will probably also involve either use of split grades/family grouping, or team teaching organized across two or three classrooms with different grades. From the child's viewpoint, we do not see acquisition settings occupying a large portion of time - perhaps an average of twenty or thirty minutes a day. (Teachers might spend as much as two or two and a half hour in acquisition work with small groups.) Consolidation settings for different subjects would probably occupy the largest proportion of the child's time. Early and late consolidation settings might alternate on different days for different children. Opportunities for independent mastery would vary with different units. We believe that it would be important to ensure that each child be involved in some projects during the year in which s/he was a relatively advanced member of the group. All "mastery settings" should include some need to use mastered academic skills.

Operating the educational programs envisioned here will also require the ability to assess children's status on mastery continua for specific skills. Developing practical ways of making such assessments will be a necessary part of the agenda

for creating expertise-supporting programs.

Two Examples of Expertise-Supporting Programs

Reciprocal Teaching. Palincsar and Brown's (1984) "reciprocal teaching" method for developing children's reading comprehension skills illustrates many of the points we have been making. Working with seventh graders whose basic reading skills were adequate, Palincsar and Brown gradually had the teacher give her role to the students. Following initial introduction of the activity to the children (acquisition) the teacher needed to provide direct prompts as part of early consolidation. (E.g., "Now A_____, since you have asked the question, can you find in that paragraph where the question is answered?") Overall, at this stage (day 3), the teacher contributed 40 percent of recorded sentences. Six of the teacher's sentences could be described as "direct" support. (Data in Brown & Palincsar, 1989, p 420). As the children gained proficiency, the teacher's role changed. By the 13th day, the teacher contributed less than 30 percent of recorded sentences. Only two of the teacher's sentences could be described as "direct" support. The students were taking a more active, "late consolidation" role. Reciprocal teaching explicitly involves changing the role of the teacher as children gain mastery of the task - not simply moving to a new and more difficult task.

A second example is Aronson et al's (1978) "jigsaw" approach to cooperative learning. Briefly, this calls for each child in a

working group to take responsibility for mastering part of a topic and teaching it to the rest of a working group. Evaluation of all students depends on the learning efforts of each individual. To us, this is a form of independent mastery - putting each student in a responsible role that will not be overtaken by other, possibly quicker students[16].

Summary: Changes in Instruction as Children Acquire Expertise.

In elementary school, able children now develop something along the lines of "elementary expertise". For children who now demonstrate little expertise, we have suggested some changes to educational practice which we believe should increase the level of self-regulation on academic tasks. Ultimately, these changes should increase the ability to apply academic skills in new settings. In other words, we believe we can increase the proportion of the population demonstrating elementary expertise. We hypothesize that the proposed combination of (1) adjusting task demands to suit children's cognitive capacity; (2) direct and indirect task directive speech modelling and support; and (3) the creation of learning settings in which "less advanced children" are in fact the "more advanced" may be necessary to accomplish this goal.

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[16] We suspect there are limitations as to how far this can be taken. For example, one would not wish to make a non-reader responsible for teaching material that must be acquired from an encyclopedia.

Implications of Programs Designed to Enhance Mastery and Expertise

We hope in the next few years to be able to prove that the kinds of programs outlined in this paper can significantly increase the proportion of children achieving real "elementary expertise". There is a catch. If the programs we envision were to be adopted, not all children would "complete" a traditional elementary school curriculum at the same age. Of course, this is the case now. The actual range of performance between the tenth and ninetieth percentiles in various subjects at the end of sixth grade runs from four to six grade levels[17]. Reviewing twenty-five years of research on his "Model of School Learning", John Carroll wrote:

> "Equality of opportunity to attain potentials implies that students with different amounts and kinds of aptitude need to have educational programs that differ in pace and content, and perhaps in many other ways. As someone has put it, we not only need equality of opportunity but also diversity of opportunity." (1989, p 30)

We agree. If more children are to become truly able to use their "academic" skills, we need to be less concerned about when children demonstrate competence and more concerned about whether

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[17] This assertion is based on an analysis of the norms of the WRAT (Jastak and Jastak, 1982) and of item norms for the Canadian Test of Basic Skills (King, 1982).

they demonstrate it. We need to attend more carefully to mastery and expertise, and less to "grade level curriculum" and "norms". Our goal should be a substantially larger group of truly literate and numerate graduates, able to use what skills they have for purposes they value.

In short, we believe the ideas put forth in this paper about how instruction changes as children gain expertise, and how a wider range of the school population might achieve some expertise are plausible. However, they are not yet proven. In sharing these observations with you, we hope that others as well as ourselves will be interested in exploring these ideas and their applications.

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